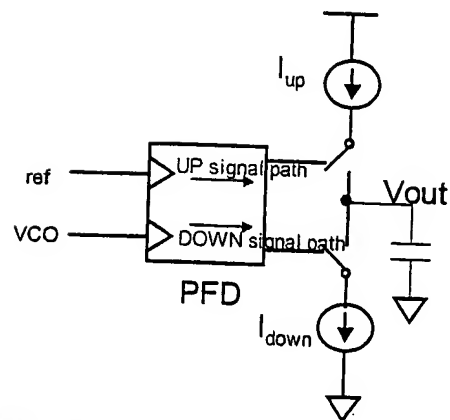


Fig. 1(a)  
Related Art

Fig. 1(b)  
Related Art



1. Mismatch in the current source :  $I_{up} \neq I_{down}$
2. Mismatch in PFD : UP signal path  $\neq$  DOWN signal path

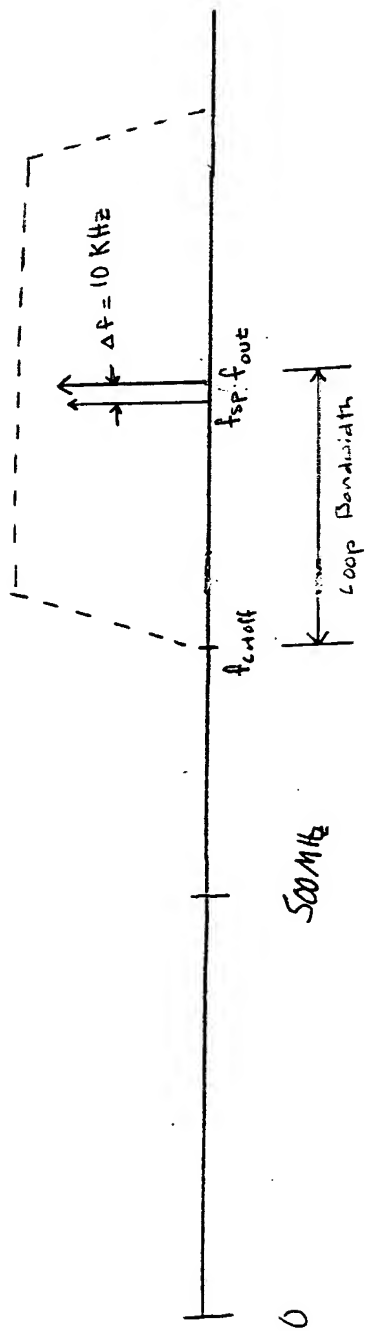


Fig. 2  
Related Art

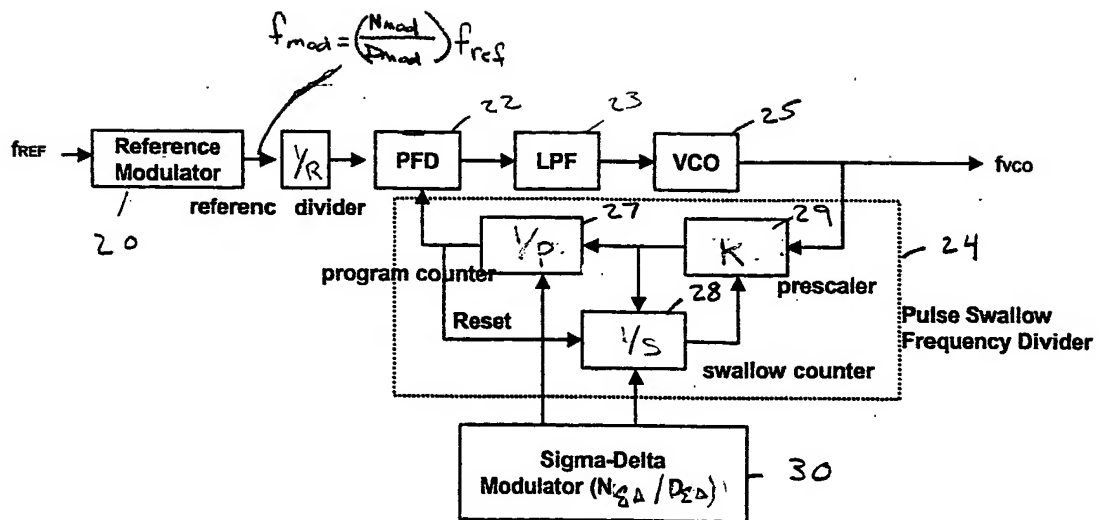


Fig. 3

$$\Delta f = \underbrace{\left( \frac{f_{ref}}{R} \right) \left( \frac{N_{mod}}{D_{mod}} \right) \left( \frac{N_{Sigma-Delta}}{D_{Sigma-Delta}} \right)}_{\text{Finely Tuned Spurious Signal Suppression}} \quad \text{or} \quad \underbrace{\left( \frac{f_{ref}}{R} \right) \left( \frac{N_{Sigma-Delta}}{D_{Sigma-Delta}} \right)}_{\text{Spurious Signal Suppression}}$$

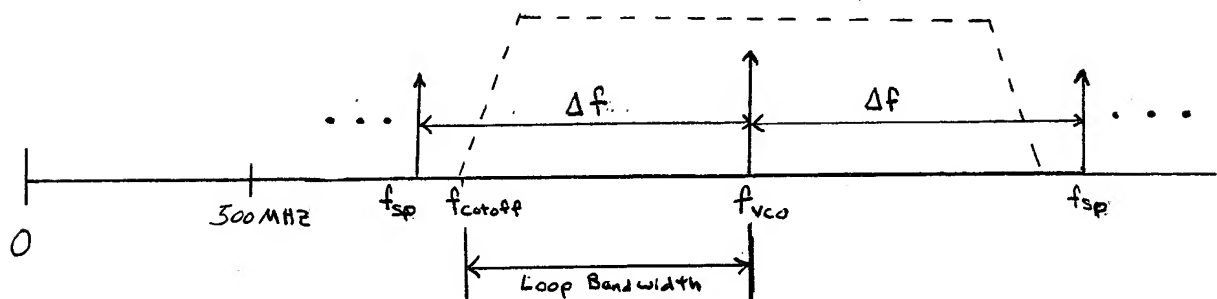


Fig. 4

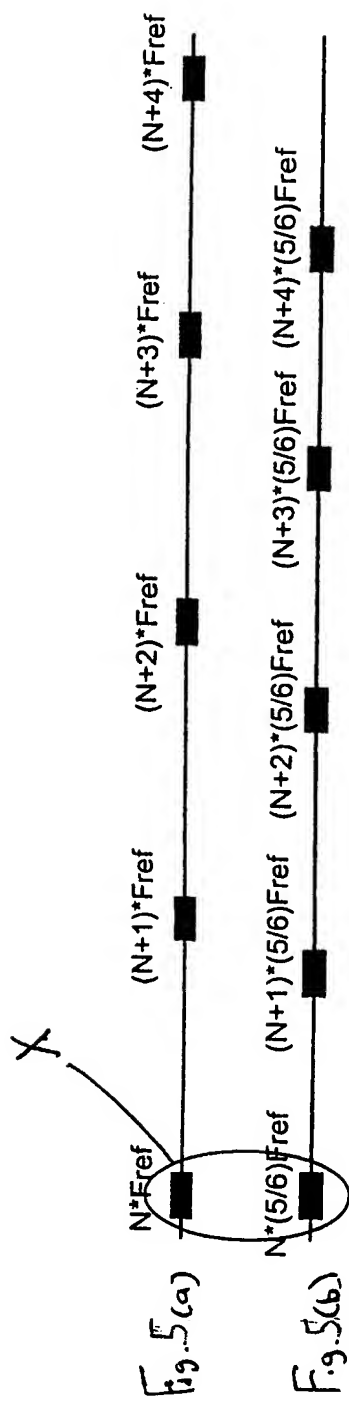


Fig. 6

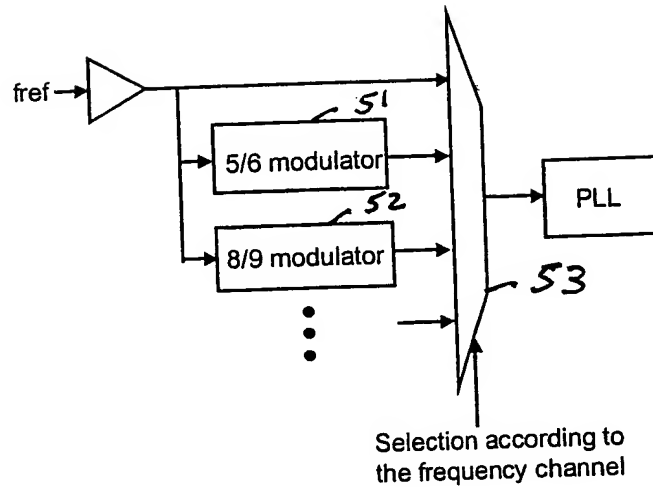
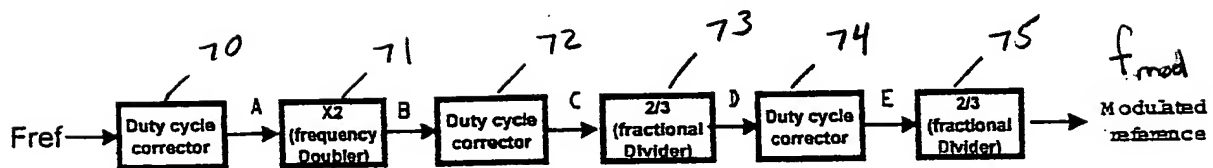


Fig. 7



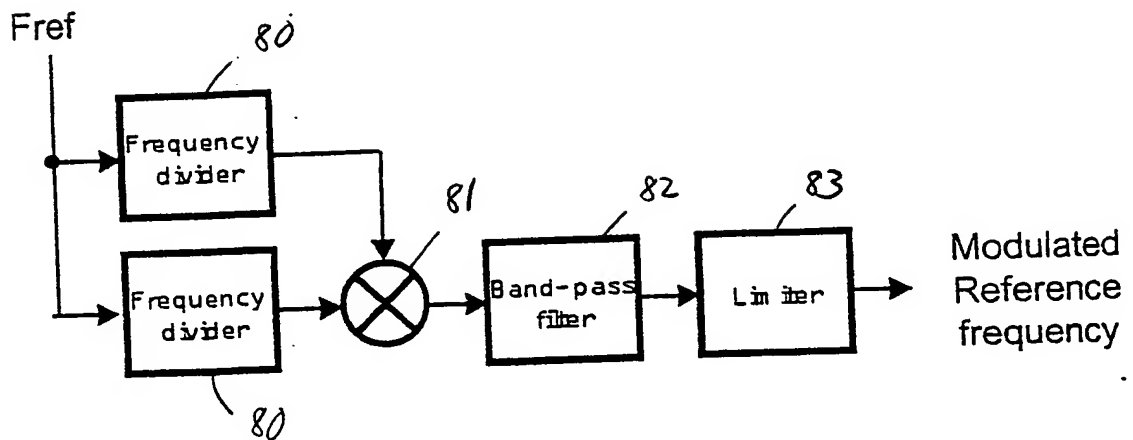
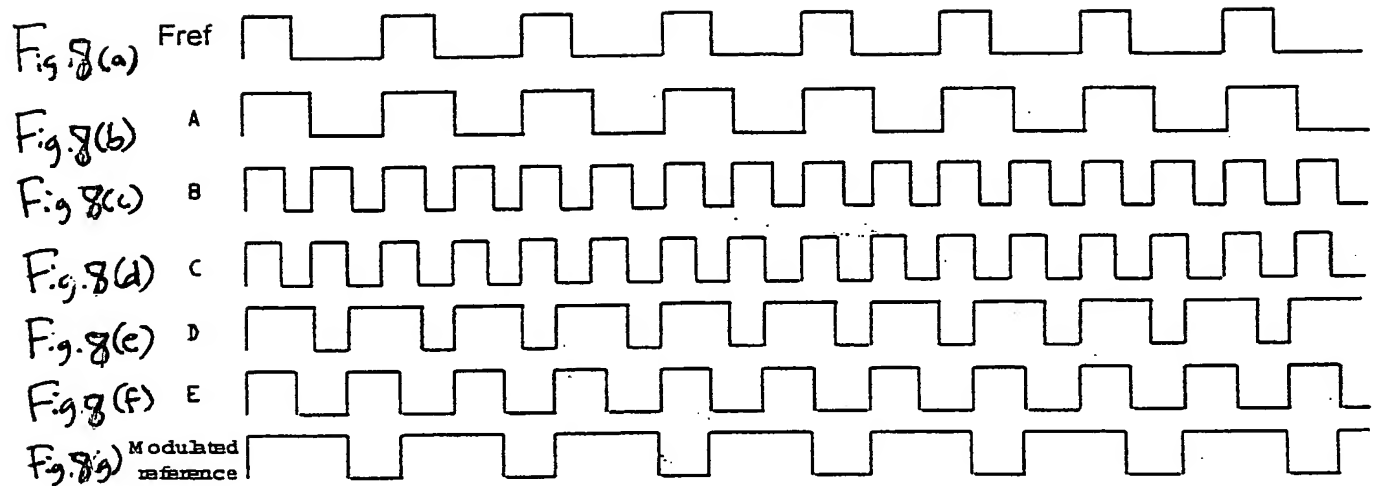


Fig. 9